UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/623,607	07/22/2003	Delphine Charlet	324-157	5066

22429   7590   03/08/2007
LOWE HAUPTMAN BERNER, LLP
1700 DIAGONAL ROAD
SUITE 300
ALEXANDRIA, VA 22314

EXAMINER
RIDER, JUSTIN W

ART UNIT	PAPER NUMBER
2626	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>22 July 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-10</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>22 July 2003</u> is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date <u>07/2003</u>.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to communications: Application filed 22 July 2003. Claims 1-

10 are pending.

Information Disclosure Statement

2.   The information disclosure statement(s) (IDS) submitted on 22 July 2003 is in

compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the

information disclosure statement.

Drawings

3.   The drawings are objected to because drawing sheet labeled 'abstract' and drawing sheet

3/3 are duplicates.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts et al.**

(USPN 6,119,084) referred to as **Roberts** hereinafter in view of **Douglas A. Reynolds,**

'Speaker identification and verification using Gaussian mixture speaker models' referred to

as **Reynolds** hereinafter.

Claim 1: **Roberts** discloses a device for adaptively recognizing and verifying a speaker, comprising:

i. means for generating beforehand, during a learning phase, parameters of an acceptance voice model relative to a voice segment spoken by said authorized speaker and parameters of a rejection voice mode (col. 5, lines 45-62); and

ii. means for updating at least one of said normalization parameters as a function of a preceding value of said one normalization parameter and the speaker verification score on each voice segment test only if the normalized verification score is at least equal to a second threshold that is at least equal to said first threshold (col. 5, lines 36-44, wherein the model (template) is updated if a [normalized speaker verification] score crosses a threshold that is *at least* equal to an acceptance threshold (col. 5, line 65- Col. 6, line 5)).

Roberts discloses the use of an acceptance model threshold to either accept or reject an input voice utterance, although failing to, but **Reynolds** does, disclose the use of both an acceptance model and a rejection model (Page 95, section 3.3, referring to H_0 and H_1), which can be commonly thought of as a garbage model within speech or voice recognition. Also, on Page 95, **Reynolds** teaches the utilization of a normalized score (A(X)) based on the likelihood ratios involving both the acceptance and rejection models. On Page 96, **Reynolds** continues by disclosing thresholds in relation to the aforementioned score to either accept or reject an input utterance as a registered user.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Reynolds** in the device of **Roberts** because the combination of a mixture of models that determine not only if the utterance is acceptable, but

also if the system is relatively certain that the utterance is not one of a registered user both

increases the amount of correct decisions (accept the acceptable and reject the non-acceptable).

Claim 2: **Roberts** discloses a device as per claim 1, wherein said normalization parameter

updated is representative of a statistical mean value of the speaker verification score (col. 7, line

55-col. 8, line 5). **Roberts** discloses wherein a mean or average of the speaker template is

maintained and updated as being a representative 'score' of the overall speech template or

model.

6.   Claims 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Roberts** in

view of **Reynolds** as applied to claims 1-2 above, and further in view of **Viikki et al. 'A**

recursive feature vector normalization approach for robust speech recognition in noise'

referred to as **Viikki** hereinafter.

Viikki discloses a system of normalizing vectors representing parameters in speech

recognition. Where **Roberts** does disclose the use of statistical methods to update parameters

(see above claim 2), **Roberts** fails to completely describe the methods of performing them.

Viikki teaches a set of feature vectors (parameters) that is used to compare an input signal when

attempting to recognize input speech. The model in this case is adaptively updated for every

incoming frame. This method provides environment-independent parameter statistics (Abstract).

These updating methods for mean and standard deviation are well-known methods for the use of

updating parameters with respect to changing conditions, such as slight changes in a speaker's

voice or background noise. It is noted that while other prior art references use mean and

standard deviation to update utterance parameters, **Viikki** clearly discloses the steps of

performing the determination and updating of speech model parameters using both mean and standard deviation.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Viikki** in the device of **Roberts** and **Reynolds** because other methods have become unreliable and the determination of a variance of a current parameter value with respect to the mean of prior parameter values is an effective way to incorporate the amount of variation into the previous value and therefore provide a very robust recognition and verification system (**Viikki**, p. 733; Introduction). ·

Claims 3-4: **Roberts** and **Reynolds** disclose the device as per claim 2 above however failing to, but **Viikki** does, specifically disclose wherein said statistical mean value $\tilde{\mu}_\lambda$ of the speaker verification score S_V is updated in accordance with the following relationship:

$$\tilde{\mu}_\lambda \equiv (1 - \tau_\mu)\,\tilde{\mu}_\lambda + \tau_\mu \cdot S_V$$

in which τ_μ is a predetermined adaptation factor (page 734, section 2.1, eqn. (4)). The applicant's adaptation factor as well as the step-size parameter of **Viikki** are both convergence factors and are updated with respect to the number of updating iterations in order to provide a rapid convergence to the desired model. For practical purposes, the adaptation factor is equivalent to the step-size parameter, λ, within the context of art-related converging parameters.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Viikki** in the device of **Roberts** and **Reynolds** for the reasons outlined above.

Claims 5-7: **Roberts** and **Reynolds** disclose the device as per claim 1 above however failing to, but **Viikki** does, specifically disclose wherein the standard deviation is used (page 734, section 2.1) and wherein said standard deviation $\tilde{\sigma}_\lambda$ of the speaker verification score S_V is updated in accordance with the following relationship:

$$\tilde{\sigma}_\lambda \equiv \sqrt{(1 - \tau_\sigma)\tilde{\sigma}_\lambda^2 + \tau_\sigma(S_V - \tilde{\mu}_\lambda)^2}$$

in which τ_σ is a predetermined adaptation factor (page 734, section 2.1, eqn. (4)). The adaptation factor is equivalent to the step-size parameter, λ that is an art equivalent factoring parameter used in the update of the standard deviation.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to include the teachings of **Viikki** in the device of **Roberts** and **Reynolds** for the reasons outlined above.

Claim 8: Claim 8 is similar in scope and content of claim 1; therefore claim 8 is rejected under the same rationale.

Claim 9: **Roberts** and **Reynolds** disclose the device as per claim 1 above however failing to specifically disclose wherein model parameters are updated using the following equation:

$$m = \frac{N_{AP}m_{AP} + N_{adapt}m_{adapt}}{N_{AP} + N_{adapt}}$$

Viikki discloses the claimed invention except for what would have been an obvious to one having ordinary skill in the art at the time the invention was made to since the examiner takes Office Notice of the equivalence of using an arithmetic mean as a recurrence equation for

its use in the art and the selection of any of these known equivalents to determine a value of a

parameter with respect to previous data in a series and updated information, which would be

within the level of ordinary skill in the art.

Claim 10: **Roberts** and **Reynolds** disclose the device as per claim 1 above however

failing to, but **Viikki** does, specifically disclose wherein the score is normalized using the

following equation:

$$S_N = \frac{S_V - \tilde{\mu}_\lambda}{\tilde{\sigma}_\lambda}$$

with the known parameters representing both mean and standard deviation (page 734, eqn (3)).

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. **Sambur (USPN 4,032,711), Juang et al. (USPN 5,675,704), de Souza et al. (USPN**

5,884,261), Newman et al. (USPN 5,946,654) utilize mean and variance in the process of

speaker verification; **Wrench, Jr. et al. (USPN 4,837,830)** discloses a multiple parameter

speaker recognition system; **Raman et al. (USPN 5,842,165)** and **Vysotsky et al. (USPN**

5,895,448) disclose the use of garbage models for speaker dependent speech recognition and

verification; **Maes (USPN 6,073,101) and Modi et al. (USPN 6,125,345)** disclose adaptive

speaker verification techniques. Also: **6,094,632; 6,107,935; 6,219,639; 6,246,980** and
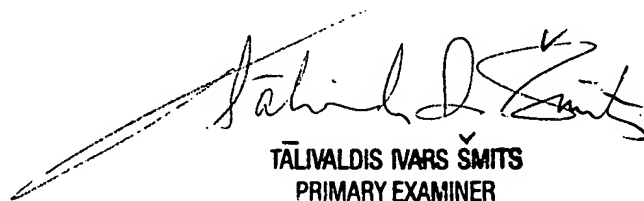
6,327,564.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin W. Rider whose telephone number is (571) 270-1068. The examiner can normally be reached on Monday - Friday 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Hudspeth can be reached on (571) 272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

J.W.R.
22 February 2007

TALIVALDIS IVARS SMITS
PRIMARY EXAMINER